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# Thoracic Endovascular Aortic Repair (TEVAR) under Local and Intravenous Anaesthesia: A Case Report

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**KEYWORDS** 

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#### ABSTRACT:

TEVAR, graft, Thoracic Endovascular Aortic Repair (TEVAR) is a minimally invasive procedure used to anesthesia treat various thoracic aortic pathologies. Anesthetic management is crucial for optimizing outcomes, particularly in high-risk patients. We present a case of TEVAR performed under local and intravenous anesthesia in a patient with significant comorbidities. A 61-year-old male with type 2 diabetes mellitus, systemic hypertension, chronic smoking, and alcoholism presented with lower limb burning sensation, exertional dyspnea (NYHA class 2), chest pain, and exertional giddiness. CT angiogram revealed an aortic arch pseudoaneurysm. TEVAR was performed under local anesthesia and intravenous sedation. Vital signs were stable (HR: 88bpm, BP: 150/100mmHg, SpO2: 99%). Bilateral femoral and left radial artery accesses were used, deploying a thoracic aortic graft distal to the left subclavian artery. Post-procedure angiogram showed successful graft deployment without complications. TEVAR under local and intravenous anesthesia is a safe and effective approach, particularly in high-risk patients. This case highlights the importance of individualized anesthetic management and the benefits of a minimally invasive approach in reducing perioperative morbidity. Further studies are warranted to validate the efficacy and safety of this technique in diverse patient populations.

### 1. Introduction

A thoracic aortic aneurysm (TAA) is a potentially fatal disorder characterised by aberrant dilatation of a part of the aorta as a result of dissection of the medial arterial layer or wall weakening. Every year, 5-10 cases of TAAs affect 100,000 people, with descending aortic aneurysms, or Type B aneurysms, accounting for about 35% of these cases [1]. Annual death rates have been documented to reach as high as 11.8% overall and to rise to 97%-100% after a TAA rupture. TAAs are regularly monitored to prevent mortality, and intervention is strongly advised when a rupture is likely [2]. Total arch replacement (TAR) is the current gold standard for TAA repair when surgery is indicated, although the use of hybrid approaches and Thoracic Endovascular Aortic Repair (TEVAR), two more recent choices, has been growing in popularity [3]. When more distal aortic regions are involved, the hybrid approach reduces procedure complexity by combining open repair with endovascular approaches. When the TEVAR approach is

used independently, there is no need to open the chest cavity. It has been demonstrated to be a safe substitute for open surgery, with superior short-term recovery results than open operations. However, complicated vasculature or insufficient landing zones continue to restrict its utilisation [4]. Here we present a case of TEVAR performed under local and intravenous anaesthesia in a patient with significant comorbidities.

### **Case Presentation**

The patient, a 61-year-old male with type 2 diabetes mellitus, systemic hypertension, chronic smoking, and alcoholism, presented with symptoms including burning sensation in both lower limbs, exertional dyspnea (NYHA class 2), chest pain, and episodes of exertional giddiness. Imaging revealed a pseudoaneurysm at the arch of the aorta on a CT thoracic angiogram, with normal left ventricular systolic function (ejection fraction 60%) and grade 1 left ventricular diastolic dysfunction on echocardiography. Referred for further management, he underwent Thoracic Endovascular

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Aortic Repair (TEVAR) under local anaesthesia and intravenous sedation. Pre-procedural vital signs were stable, with a heart rate of 88 beats per minute, blood pressure of 150/100 mmHg, and peripheral oxygen saturation of 99% on room air. Anaesthesia was supplemented with midazolam (2 mg) and fentanyl (100 mcg). The procedure involved bilateral femoral artery and left radial artery access, with deployment of a thoracic aortic graft system (Relay NBS) distal to the left subclavian artery. Post-procedure, a check angiogram confirmed proper graft deployment without complications. This approach minimized the risks associated with general anaesthesia, particularly in a patient with multiple comorbidities, and allowed for prompt intervention and resolution of the aortic pathology.

Figure-1: 64-slice CT aortic angiogram



Figure 2: Thoracic aortic grafting deployed distal to the left subclavian artery.



Figure 3: post -operative chest x-ray with endovascular graft in situ

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### 2. Discussion

The effective deployment of Thoracic Endovascular Aortic Repair (TEVAR) for Type B Thoracic Aortic Aneurysm (TAA) necessitates a proximal landing zone exceeding 2 cm to mitigate stent leaks or migration [5]. Given the intricate vascularity of the patient's arches, covering all three head vessels was imperative to establish a suitable landing zone near the aortic root. Although in-situ laser fenestrations have shown utility in emergent procedures and single arch vascular occlusions [6,7], extending the landing zone to zone 0 for Type B TAA repair remains unexplored. While parallel grafting techniques like the chimney approach hold promise, long-term data and clinical support are crucial before considering them as primary therapeutic options for complex TAAs [8].

In this case, local infiltration was administered at all access sites before intervention. Three access sites were utilized, including bilateral femoral arteries via cut down and the left radial artery. An aortogram was conducted through the left femoral approach. Subsequently, a right femoral artery cut down was performed, and the Relay NBS Plus thoracic aortic graft system was deployed distal to the left subclavian artery. A check angiogram revealed a well-deployed aortic graft and patent left subclavian artery, free from edge dissection, thrombus, or endovascular leak.

The choice of anesthesia for TEVAR necessitates careful consideration of the patient's surgical requirements and comorbidities. Options include local anesthesia with intravenous (IV) sedation or general anesthesia, tailored to individual circumstances. Neurologic injury risk during TEVAR underscores the importance of meticulous blood pressure management to minimize spinal cord ischemia. Moreover, the risk of post-TEVAR

contrast nephropathy emphasizes preemptive measures such as intraoperative and postoperative intravenous hydration, especially in cases with higher contrast volumes and renal artery involvement.

Performing TEVAR under local and intravenous anesthesia offers advantages in ensuring patient comfort and prompt complication detection. This approach enables vigilant monitoring and intervention, optimizing patient outcomes while mitigating the risks of neurologic injury and contrast-related complications.

### 3. Conclusion

Thoracic Endovascular Aortic Repair (TEVAR) conducted under local and intravenous anesthesia proves to be a feasible and advantageous approach, enhancing patient safety and procedural outcomes by enabling early complication detection. This anesthetic strategy, offering a less invasive alternative, is particularly beneficial for high-risk patients, including the elderly and those with underlying health conditions where general anesthesia poses heightened risks of morbidity. By optimizing patient comfort and minimizing procedural complexities, TEVAR under local and intravenous anesthesia emerges as a prudent choice, promising improved clinical management in diverse patient populations. This case underscores the importance of individualized anesthetic management and the benefits of a minimally invasive approach in reducing perioperative morbidity, while further studies are warranted to validate the efficacy and safety of this technique across various patient demographics.

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